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OAK RIDGE NATIONAL LABORATORY
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DATE: July 2, 1952

SUBJECT: Procedure Change for Handling Adjustments to Discharged Irradiated "X" Slugs Material Balance

TO: See Distribution

FROM: H. F. Stringfield

Distribution:
1. R. V. McCord
2. J. A. Cox
3. P. B. Orr
4. M. E. Ramsey
5. H. F. Stringfield

DECLASSIFIED By Authority Of: E J Murphy 9-18-61
[signature]
For: H. T. Seay, Supervisor
Laboratory Records Dept.
ORNL

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Intra-Laboratory Correspondence

To: See Distribution Date: July 2, 1952

From: H. F. Stringfield

Subject: PROCEDURE CHANGE FOR HANDLING ADJUSTMENTS TO DISCHARGED IRRADIATED "X" SLUGS MATERIAL BALANCE

Reference: Letter from Mr. Kenneth Kasschau to Dr. C. E. Larson, dated June 12, 1952, Document Number ORO 19058.

I Introduction

In the reference letter the Laboratory was requested to change its method of reporting the production of plutonium and correct the depleted uranium, X slug material balance, to conform with the following:

"1. Enter plutonium produced as a receipt (no change from current practice).

2. Enter U-235 'burn-up by fission' as a removal from the U-235 column of the 'less than 75% U-235' material balance.

3. Enter the sum of the U-235 in (2) above and the U-238 consumed in producing the plutonium reported under (1) above as a removal from the total uranium column of the 'less than 75% U-235' material balance".

In addition the reference letter states, "It is not deemed necessary or desirable to report these data on a slug-by-slug basis-" i. e. total uranium adjustment.

II Present method Employed - (For background Information Only)-

Under the system employed since September 1949, we have handled this problem as follows: (1) the plutonium produced has been pro-rated by average on an entire row of slugs, based on distribution of accumulated KWH in accordance with calculated flux factors. (This method will be continued); (2) Uranium slugs have been considered as normal uranium until discharged from the reactor and as depleted uranium after discharge. (This will hold true under the new system); (3) The difference between U-235 content in normal U slugs (1166 grams X 0.7115%) and the U-235 content in depleted U slugs (computed on the basis of 1166 grams X 0.7115% minus Pu content X 1.25) has been reported to the AEC as an unaccounted for loss. In the past this loss has been computed monthly by the SF Office on the basis of total Pu discharged times the 1.25 fixed factor.

This computation has been checked against amounts shown on completed forms X-150, Intra-Laboratory Material Transfer, and the monthly inventory submitted for the Reactor and Canal accounts X-slug balances (4) No consideration has been given to the quantity of U-238 which was transmuted into plutonium nor to the reduction of the total uranium quantity which is affected by burn-up of U-235.

Beginning with the reporting period June 1, 1952 through June 30, 1952 the provisions of the attached procedure which incorporates minor changes in the existing method and also includes the method for correcting total uranium, will become effective. In the future please submit the discharged slug SF data in accordance with the new procedure.

H. F. Stringfield

HFS:bb

Attachment

Distribution:
1. R. V. McCord
2. J. A. Cox
3. P. B. Orr
4. M. E. Ramsey
5. H. F. Stringfield

Subject: PROCEDURE FOR COMPUTING AND REPORTING SF INVENTORY DATA ON DEPLETED URANIUM X SLUGS DISCHARGED FROM THE 3001 REACTOR

1. Computing and Reporting Plutonium Content of Discharged Slugs.

   A. The computation method used at present may be continued without alteration.
   The computed plutonium quantity discharged is to be entered on form X-150, Intra-Laboratory Material Transfer, along with other SF data, in the same manner as has been done in the past.
   The Pu inventory report should be submitted in the same manner as has been customary in the past; however an additional caption, termed "Pu Produced by 3001 Reactor" should be included as a memoranda item. It is suggested that this memo be entered as a footnote on the canal inventory breakdown sheet covering depleted uranium and Pu. All that is necessary to acquire this figure is to sum the amount of Pu discharged during the month covered by the report.

2. Computing and Reporting U-235 Burn-up on Discharged Slugs.

   A. Computation of U-235 burn-up will be continued as in the past, i. e. 1.25 times the amount of Pu produced. The resulting reduced quantity of U-235 is to be entered on form X-150, Intra-Laboratory Material Transfer in the same manner as has been done in the past. The depleted uranium, U-235 content, inventory report may be submitted in the same manner as has been customary in the past; however, an additional caption, termed "Burn up By Fission" should be included as a memoranda item. It is suggested that this memo be entered as a foot note on the canal inventory breakdown sheet covering depleted uranium and Pu. All that is necessary to compute this figure is to multiply the total amount of Pu discharged during the month by the factor 1.25; however, the result should also equal the difference between the U-235 content, as calculated in "as normal uranium slugs"-(total U times 0.7115%) and the sum total computed as remaining in the "as depleted slugs", based on the X-150 forms covering discharges from the reactor.

3. Computing and Reporting Total Uranium Adjustment on Discharged Slugs.

   A. In order to accomplish an adjustment on total uranium content (as requested by the AEC) consideration must be given to two factors, namely, the calculated quantity of the Pu formed from U-238 plus the quantity of U-235 burned up by fission. Upon ascertaining the amount of Pu produced and the U-235 consumed, add the two quantities together; however, it is not deemed necessary or desirable to report these data on a slug-by-slug basis. Accordingly, no adjustment is made on total uranium content of individual slugs.

They will continue to be carried for inventory purposes at 1,166 grams per slug.

The adjustment will be handled as follows: an X-150 form will be initiated debiting SF Accountability Control Account, "Burn-up By Fission" and Crediting Tank Farm Code 31 account. In preparing the transfer the total uranium amount should be shown in the column headed "Net Weight of SF Material (Grams)". Leave all other columns blank. The reason for the transfer should be given in the "Remarks" space.

The reasons for running the adjustment credit through the Tank Farm Account are to simplify record keeping, and retain the average weight of a slug at 1,166 grams total U content. Justification for handling in this manner is based on the assumption that 95-98% of slugs discharged will ultimately be dissolved, the Pu extracted, and the sludge sent to the Tank Farm.